

Stanford University / Brown University / Spelman College

iGEM Team

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iGEM, Undergraduate

Towards a Biosynthetic UAV

We are currently working on a series of projects towards the construction of a fully biological unmanned aerial vehicle (UAV) for use in scientific and humanitarian missions. The prospect of a biologically-produced UAV presents numerous advantages over the current manufacturing paradigm. First, a foundational architecture built by cells allows for construction or repair in locations where it would be difficult to bring traditional tools of production. Second, a major limitation of current research with UAVs is the size and high power consumption of analytical instruments, which require bulky electrical components and large fuselages to support their weight. By moving these functions into cells with biosensing capabilities – for example, a series of cells engineered to report GFP, green fluorescent protein, when conditions exceed a certain threshold concentration of a compound of interest, enabling their detection post-flight – these problems of scale can be avoided. To this end, we are working to engineer cells to synthesize cellulose acetate as a novel bioplastic, characterize biological methods of waterproofing the material, and program this material's systemic biodegradation. In addition, we aim to use an “amberless” system to prevent horizontal gene transfer from live cells on the material to microorganisms in the flight environment.

Lab/Project: Rothschild Lab – Synthetic Biology (Code SGE)

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